SOME NEW BOOKS.

Flying Machines.

The series of articles on *Progress in Flying Machines* contributed by Mr. O. CHANUTE to the *American Engineer* is now being republished in book form. It will probably surprise most readers to learn how much has been accomplished toward overcoming the difficulties involved, and to what extent the elements of a possible future success have been multiplied within the last few years. The aim of the articles here collected is threefold: First, to answer the question whether with our present mechanical knowledge and appliances, more particularly the light motors recently devised, men may reasonably hope eventually to fly through the air. This question is answered in the affirmative. The writer's second purpose was to avert the waste of effort on the part of inventors, which would result from trying over again devices which have already failed. To that end an attempt has been made to produce an exhaustive record of experiments hitherto made, and to point out the causes of their failure. Connected with this record is the effort to enable an investigator to distinguish between proposals foredoomed to failure, and designs worthy of consideration, and, perhaps, of trial on an adequate scale. We cannot in the scope of this notice undertake to review the various attempts that have been made to compass artificial flight, but we can briefly indicate the conclusions at which the author has arrived.

The failures of the innumerable flying machines that have been constructed have resulted from so many different causes that it is evident that many conditions have to be taken into account. These conditions virtually constitute each a separate problem, which can probably be solved in more ways than one. These various solutions must then be harmoniously combined in a design which shall deal with the general problem as a whole. Of these separate conditions or problems, Mr. Chanute enumerates ten, but, proceeding to discuss them in detail, he shows that many of them have been approximately solved, especially since 1889, and that concerning several others a better understanding of the difficulties to be surmounted has been attained.

I.

The first problem considered is that pertaining to the resistance and supporting power of the air. Up to a few years ago it could not be determined by the use of the then current formulas how birds were supported in flight. Now, however, that Prof. Langley's experiments have confirmed many previously tried, one may accept the empirical formula of Duchemin with reference to "lift" and "drift" as approximately correct, and figure out the support and the resistance with confidence that we shall not go far wrong. These calculations seem to indicate that artificial flight is possible, even with planes; that very flat angles of incidence, from 2° to 5°, formerly considered inadmissible, will in fact be the most advantageous, and that within certain limits of "hull resistance" high speeds will require less power than low speeds, because they admit of obtaining support from the air at a flatter angle. Mr. Chanute shows in the body of his book that the "drift" diminishes as the angle of incidence becomes less, that the "hull resistance" (including car, framing, braces, &c.) increases as the square of the speed; that the skin friction is so small that it may for the present be disregarded; and that it is now possible to calculate, approximately at least, the power required to obtain support with planes, and to overcome the resistance, although we are not yet aware what limit will be imposed upon the size of artificial apparatus by the law that the weight will increase as the cube, while the sustaining surfaces will grow only as the square of the similar dimensions. It is further to be noted that the formulas which give this promise of success were derived from experiments with plane surfaces, whereas it is already known that concavo-convex surfaces will be still more effective, although the most favorable shapes are not yet precisely ascertained. This statement indicates the direction which scientific investigation and experiment should now take, and holds out the hope that the first sub-problem is in a fair way of being solved.

II.

The second sub-problem, which is concerned with the motor to be employed, was for a long time considered the most unsolvable. It seemed hopeless to attempt to rival with an artificial motor the output of energy appertaining to the motor muscles of birds, which, there is reason to believe, develop work in ordinary flight at the rate of one horse power to twenty pounds of weight, and can, for a brief period in rising, give out energy at such a rate as to represent an engine developing one horse power and yet weighing only five or six pounds. The lightest engines in use in 1890 weighed, including the generator of power, 60 pounds per horse power for steam, 88 pounds per horse power for gas engines, and 130 pounds per horse power for electric motors. Since 1890, however, marine (yacht) engines have been reduced more than one-half in weight. Mr. Hargrave has produced a steam engine weighing but 10.7 pounds per horse power, M. Maxim has created one weighing but 8 pounds per horse power, including a condenser, and other experimenters have approximated closely to the same weights. Steam engines, therefore, seem to have been so much reduced in weight as to admit of their being employed as motors for flying machines. This, however, is not put forward by Mr. Chanute as a final solution, for it may be that, as has been hinted by M. Maxim, some form of gas or petroleum engine will prove to be still better adapted to aerial motion. Meanwhile, it is possible to utilize a still lighter power, for Mr. Chanute demonstrates in the body of this book that the wind may be turned to account under favorable circumstances, and that it will furnish an extraneous motor which costs nothing and imposes no weight upon the apparatus. Just how much wind power can be utilized cannot well be told in advance of experiment, but the author estimates that under certain supposed conditions it may be as much as six horse power for an aeroplane with 1,000 square feet of sustaining surface; and it is also pointed out that, while but few experimenters have resorted to the wind as a motor, these few have accomplished remarkable results.

III.

As regards the selection of the instrument through which propulsion is to be obtained, experiments have proved that reaction jets, whether from explosives, steam or blasts of air; that wave action; that valvular, folding or feathering paddles or vanes; have all turned out, on practical application, to be inferior to screw propellers or to propelling wings, and that the two latter appliances are about equally effective. It is to be understood, however, that this statement refers to wings considered only as propelling instruments, and not as sustaining surfaces. The conclusion is that the third problem may now be solved either with screws or with waving wings, as may best suit the rest of the design. This brings us to the fourth and important sub-problem, namely, what kind or form of apparatus should be selected for sustaining the weight—whether flapping wings, screws, or aeroplanes. It is suggested that the best measure of comparison will be the weights which experiment shows may be sustained per horse power with each form, considered in connection with the weight of the construction required to make that form abundantly strong against the resulting strains. The difference between the weight sustainable and the necessary weight of the construction will indicate the proportion of the whole weight which may be devoted to the motor. Going on to examine separately each of the three kinds of apparatus, Mr. Chanute says that we do not yet know accurately how many pounds per horse power can be sustained with a bird-like apparatus of flapping wings. On the whole, however, our author is induced to admit that about 100 pounds per horse power may be sustained with flapping wings, this including the power required both to support the weight and to overcome the head resistance. He believes, moreover, that in a machine of sufficient size to sustain one man, the strength required to resist the constant reversal of strains due to the alternating motion of the wings will involve such dimensions that the weight of the apparatus and man will amount to at least three-fourths of the whole, thus leaving but one-fourth of the total weight applicable to the motor and its adjuncts, including the fuel and supplies for the journey.

Concerning aerial screws there is no lack of experimental data. Nadar, Wenham, and Freninges each obtained a sustaining effect of 33 pounds per horse power; Dahlstrom and Lohman secured 37.0 and 55 pounds per horse power; while Renard got from 17 to 48 pounds thrust by screws rotating at various speeds, and Moy recorded 40 pounds per horse power sustained from a wind wheel with vanes of variable pitch. These performances, however, included a certain amount of ascension, which absorbed part of the power, so that M. Chanute feels safe in assuming that in mere horizontal flight some 45 pounds per horse power can be sustained with screws. As the strains, moreover, in a rotating apparatus will be less destructive than those involving reversals of motion, it seems probable that screws may be constructed with a less weight of materials than flapping wings of the same sustaining power. The author estimates that an apparatus can be framed to sustain the weight of one man with rotating screws, in which only about two-thirds of the weight shall be absorbed by the framing, screws, car, and man, thus leaving one-third of the whole weight for the motor and its adjuncts. There are also many experimental data concerning aeroplanes. Prof. Dangley sustained a maximum of 209 pounds per horse power with planes at an angle of incidence of 2°, and M. Maxim sustained 133 pounds per horse power at an inclination of 1 in 14. Neither of these performances took into account the head resistance due to the framing and car which are indispensable in an actual machine. With a complete model Tatin sustained 110 pounds and Hargrave 89 pounds per horse power in horizontal flight. Our author concludes that 100 pounds per horse power can be sustained in horizontal flight with an aeroplane. As the latter consists of fixed surfaces receiving no strains save the sustaining pressure of the air, Mr. Chanute believes that this kind of apparatus can be constructed of sufficient size to sustain one man so that about one-half of the whole weight shall be devoted to the motor and its adjuncts. It would seem to follow that aeroplanes are the best forms to experiment with, inasmuch as they admit of a larger proportion of the whole weight being appropriated to the motor. In the judgment of our author this comparison of the three kinds of apparatus also indicates the possibility of success in artificial flight with motors weighing 10 or 15 pounds per horse power, provided that the remaining problems can be also solved; but we are cautioned not to overlook the fact that more power will be required in rising from the ground than in horizontal flight, and that the actual proportion of the total weight available for the motor, although in this book conservatively estimated from the best data attainable, is still a matter to be determined by experiment. It is to be observed that the common basis here selected for comparison is that size of apparatus which would be sufficient to support the weight of one man. This is the smallest that can be adopted, and theoretically it is the most favorable, for inasmuch as the weight of the framing will presumably increase as the cube of the dimensions, while the sustaining surface will only increase as the square of these same dimensions, it is obvious that the proportion of the total weight sustained which can be spared for the motor will not be constant, but that the larger the apparatus the smaller proportion of the total weight will be available for the engine and its adjuncts. Flying machines, therefore, should preferably be designed as small as is practicable, and experimenters will place themselves at a disadvantage if they construct large machines.

IV.

As regards the fifth problem—the amount of sustaining surface required—it depends on the speed, and Mr. Chanute deems it probable that within certain limits no particular extent (in ratio to the weight) can be said to be absolutely the best, because a large part of the resistance will consist in the "drift" (the retarding force against horizontal motion), and the latter is independent of the area of the sustaining surface, a small area at high speed being able to sustain as much weight as a larger area at a corresponding lesser speed. Practically, however, the weight of the necessary framing and the hull resistance (the term hull includes car, braces, &c., as well as framing) will determine the ratio of surface to weight which will be most advantageous. Encouraging experiments have been made with surfaces varying from seventy-five one-hundredths of a square foot per pound in the case of Lilienthal, to seven square feet per pound in the case of Hargrave. Our author thinks it probable that the latter ratio was in excess, and that it would be expedient to confine the dimensions of flying machines within the proportions which obtain among fast-flying birds, these ranging from 3.62 square feet per pound, in the case of the swallow, to 0.44 square feet per pound in the case of the male duck, with which areas, if we consider their wings as planes and the angle of incidence to be 3°, the swallow requires a speed of 23.1 miles an hour and the duck a velocity of 66.2 miles per hour to sustain their flight. To come down safely at the speed of the parachute requires about the ratio of the swallow, while the proportions of the duck are more favorable to high speed. As the "drift," or retarding force against horizontal motion, will increase only if the angle of incidence be increased, it would seem preferable to maintain this angle as uniform as possible and to provide variable supporting surfaces to be folded or unfolded with variations of speed, if such a construction can be devised in connection with the concavo-convex surfaces which have been mentioned as likely to give the most satisfactory results.

V.

The sixth problem cannot be said to be solved, for there is considerable uncertainty concerning the best materials to be employed for the framing and for the moving parts; and also as to what should be the texture of the sustaining surfaces in an actual flying machine. Hitherto the main object has been to construct a model which would fly at all; and experiments with models have not thrown much light on the question of materials. If a partial success be attained, this sub-problem will assume greater importance. It involves considering materials from a somewhat new point of view, or investigating their strength and stiffness per unit of weight. The quill of a bird's feather is stronger and more elastic than an equal weight of steel, and the texture of its barb is peculiar. To Mr. Chanute it now seems probable that bamboo, the lighter of the stiff woods, and some varieties of steel will be found to be the preferable materials for framing. He points out that, contrary to popular belief, aluminium is inferior to steel per unit of weight, particularly in compression; but it does not corrode, and on that account may be recommended. It may be utilized for the sustaining surfaces either as thin sheets or as wire gauze made smooth by some coating; but in our author's opinion textile fabrics will probably be the first to be employed for full-sized apparatus. One important requirement, however, is that the surfaces shall not unduly change their shape under varying air pressures. They must be rigid, and perhaps elastic, and the fluttering of textile fabrics is likely to give trouble to experimenters. It may be, therefore, that thin wood, parchment, or pasteboard may prove preferable, the latter being corrugated lengthwise of the direction of motion in order to gain stiffness. We are reminded that the barb of a feather is smooth in one direction and asperous in the other; and it is pronounced possible that a similar texture of surface may prove of advantage in flying machines, but this probably will not be determined until partial success has been achieved with an apparatus of sufficient size to sustain the weight of a man.

VI.

The problem of the maintenance of equilibrium is in Mr. Chanute's view the most difficult now remaining to be solved. Almost every failure in actual experiments has resulted from lack of equilibrium. This is the capital requisite, for manifestly safety is the supreme test of successes in aerial navigation—safety in starting up, in sailing, and in coming down. If a flying machine were only required to sail at one unvarying angle of incidence in calm air, the problem here propounded would be much easier of solution. The centre of gravity would be so adjusted as to coincide with the centre of pressure at the particular angle of flight desired, and the speed would be kept as regular as possible; but the flying machine, like the bird, must rise and must fall, and it must encounter whirls, eddies, and gusts of wind. The bird meets these by constantly changing his centre of gravity; he is an acrobat and balances himself by instinct; but the problem is very much more difficult for an inanimate machine; and the latter requires an equipoise—automatic if possible—which shall be more stable than that of the bird. Experiments described in the body of this book have shown that transverse stability may be secured in two ways; first, by placing the two halves of the sustaining surfaces at a diedral angle to each other; and, secondly, by adding a longitudinal keel to the apparatus, as in the case of Mr. Boynton's fin kites. The mode of action is practically the same for both devices, and consists in producing increased air pressure upon the side which tends to dip downward. The two devices may be employed conjointly, but the keel will produce less head resistance to forward motion than the diedral angle, which resistance, however, may be diminished by turning upward only the outer ends of the sustaining surfaces in a manner similar to the upbending primary feathers of the soaring birds. Longitudinal stability may be promoted in three ways; first, by additional surfaces at a slight angle to the main sustaining surface; secondly, by placing several surfaces behind each other; and, thirdly, by causing the centre of gravity always to coincide with the centre of pressure. The first way corresponds to the just-mentioned method for procuring transverse stability by means of surfaces at a diedral angle; it is illustrated by Maxim's aeroplane, in which two such surfaces are affixed, front and rear; and by Pénaud's aeroplane, in which but one is affixed, at the rear. The second way is exemplified in Brown's bi-planes and by Hargrave's cellular kites, and the third is the method universally employed by the birds. For an artificial apparatus the method last referred to constitutes as yet an unsolved problem. Several inventors have proposed methods of shifting weights to change the position of the centre of gravity as the apparatus changes its angle of incidence, but none of these is automatic, and none has been practically tested.

VII.

The guidance in a vertical direction, *i. e.*, up or down, will depend in a great degree upon success in the changing of the centre of gravity to which reference has just been made. It may be partly effected by changes in the speed or by horizontal rudders, but in such a case the equilibrium will be disturbed. Guidance in a horizontal direction has been secured, as has been shown in several experiments, by vertical rudders; but there are probably other methods still more effective, although their merits remain to be tested by actual experimentation. Upon the whole, Mr. Chanute believes that this sub-problem, although it may give trouble, is not unsolvable. A really adequate flying machine, however, can hardly be said to have come into existence until it possesses the power of starting up into the air under all conditions. This problem is as yet unsolved, and may not be until the other sub-problems have been successfully worked out. It is clear that in rising upward more power will be required than in horizontal flight; for to the force required to obtain horizontal support must be added that required to ascend, and the latter force will vary with the rapidity of the upward motion. Three methods have been made the subject of experiments; first, by acquiring speed and momentum on the ground; secondly, by the reaction of rotating screws; thirdly, by utilizing the force of the wind. The first method requires the use of special appliances, such as railway tracks, so that its application would be limited; and the third method requires that a wind shall be blowing, and with sufficient force; either or both methods may be utilized with the earlier types of practical machines, should such be developed; but the writer of this book thinks that the method of rising through the reaction of a screw will eventually supersede the others. It will involve the difficult designing of a form of sustaining surfaces which can be alternately rotated as a screw or held as a fixed aeroplane in sailing, the change being effected while under motion in the air. Mr. Chanute does not believe that a bird-like machine can rise into the air under all conditions by flapping its artificial wings. It would need to be already up some distance to permit such action. Birds spring up three or four times their own height, or run against the wind to acquire speed, and with vigorous flaps of wing they rise at an angle seldom greater than forty-five degrees; but their initial action would be quite impracticable for a machine of sufficient size to sustain a man.

VIII.

The alighting safely anywhere is also an unsolved sub-problem, and one, obviously, of vital consequence. It has been slurred over by most inventors of flying machines, and the best method which has been thus far proposed involves the selection of a smooth, soft piece of ground and the alighting thereon at an acute angle. When it is considered that the speed necessary for support will be somewhere from twenty to forty miles an hour, it is manifest that the alighting will be somewhat dangerous, and that it would be preferable, if the design of the apparatus will permit of it, to imitate the manœuvre of the bird, who stops his headway by opening his wings wide, tilting back his body, and obtaining the utmost possible pressure and retardation from the air before alighting upon the ground. This would require for a flying machine a rapid change of the centre of gravity so as to tilt the apparatus backward to the angle of maximum "lift" (by lift is meant the force which sustains weight vertically as against gravity), and, immediately thereafter, a counter change of the centre of gravity so as to bring the apparatus back upon an even keel in order to alight at the diminished velocity. This manœuvre, we are told, is not as difficult and dangerous as at first sight it appears; but the author considers that it would be preferable to utilize the reaction of a rotating screw to diminish the forward motion and to hover over the ground before alighting. This involves the same difficulty in design which has been mentioned as desirable for use in rising, for it seems scarcely practicable, within the requisite limits of weight, to provide two sets of sustaining surfaces, one set to be used in rising and in alighting, and the other to serve in horizontal flight. These last two sub-problems, the rising and the alighting safely, without special preparation of the ground, are acknowledged to be very difficult of solution, and will probably be the last to be worked out.

IX.

The general problem having been thus decomposed into its several elements, and each element having been considered as a separate sub-problem, it is plain that the mechanical obstacles to be surmounted are very great, but Mr. Chanute deems it fair to say that none of them can now be pronounced insuperable, and that material progress has recently been made toward their solution. The resistance and the supporting power of air are approximately known; the motor and the propelling instrument are probably worked out sufficiently to make a beginning; we know in a general way the kind of apparatus to adopt, its approximate extent, and the required texture of the sustaining surfaces; there remain to be solved the problems of the maintenance of the equilibrium, the guidance, the starting up, and the alighting, as well as the final combination of these several solutions into one homogeneous design.

In spite, therefore, of the repeated failures recorded in this volume, it is the author's conviction, resulting from a prolonged investigation of the progress in flying machines, particularly the progress made in recent years, and from a study of the principles and problems involved, that, once the sub-problem of equilibrium solved, man may reasonably hope to navigate the air, and that this will probably be accomplished—perhaps at no very distant day—with some form of aeroplane provided with fixed concavo-convex surfaces, which will at first utilize the wind as a motive power, and eventually be provided with an artificial motor.

Every one interested in flying machines ought to read this book carefully from the first page to the last. Here we have been able only to present the author's conclusions, but the grounds for these cannot be properly appreciated except by those who will follow patiently Mr. Chanute's analysis of the many actual experiments in aerial navigation, and especially of those which have been made during the last few years.

X.

Before taking leave of this interesting volume we should at least glance at the author's view of the commercial and military consequences of success in aerial navigation. To Mr. Chanute it seems quite certain that flying machines can never carry even light and valuable freights at anything like the present rates of land or water transportation, so that those who may apprehend that such machines will, when successful, abolish frontiers and tariffs, are probably mistaken. Neither are passengers likely to be carried with the cheapness and regularity of railways, for, although the wind may be utilized at times and thus reduce the cost, it will introduce uncertainty in the time required for a journey. It is also Mr. Chanute's opinion that flying machines are not likely to prove efficient in attacks upon hostile ships and fortifications. They cannot be relied upon to drop explosives with any accuracy, because the speed will be too great for exact aim when the distance and height from the object to be hit cannot be precisely known.

M. W. H.

What Is the Truth About Richard III.?

Mr. Francis P. Harper has done well to publish a new edition of the *Memoirs of King Richard the Third*, by JOHN HENEAGE JESSE, for the original work has been out of print for many years, and copies of it have been procurable only at great cost. The question whether Richard III. was really the monster of wickedness depicted by Shakespeare, who followed the chroniclers of the Tudor period, was mooted by Horace Walpole in "Historic Doubts," but it remained for Mr. Jesse to make it the subject of a rigorous historical inquiry in the light of contemporary documents. It should be understood at the outset that no sweeping process of whitewashing is attempted in the two volumes which make up this work. The author believed that Richard III. has justly been held responsible for the murder of his nephews, the sons of Edward IV., and he agreed with those who have assumed that the skeletons unearthed in the reign of Charles II. at the foot of a stairway in the Tower were those of the young Princes. But he also held, as the result of an impartial and first-hand investigation, that this crime was the only one with which Richard is justly chargeable, and that, had the outcome of the battle of Bosworth field been different, he would have been treated by historians at least as favorably as Henry IV. and Edward IV., to each of whom the guilt of assassination may be imputed on equally strong evidence. The murder of Richard II. can be brought home to Henry IV., and that of Henry VI. and of the latter's son, Edward Prince of Wales, to Edward IV., quite as directly as can that of Edward V. and his young brother, the Duke of York, to Richard III. Why, then, should Richard III. be described as a monster without precedent or parallel even among mediæval sovereigns?

I.

The earliest crime in point of date which the Tudor chroniclers have attributed to Richard of Gloucester is a share in the murder of Edward Prince of Wales (heir of the House of Lancaster), after the battle of Tewkesbury. According to the common version of this tragedy, Edward IV., on the young Prince being brought into his presence, haughtily asked him how he dared to take up arms against his lawful sovereign. With a boldness and a dignity such as became a grandson of Henry V., the royal youth replied that he was in arms to rescue a father from miserable oppression, and to recover a crown that had been violently usurped. Incensed at his hardihood, the King is said to have struck him with his gauntlet, on which the Dukes of Clarence and Gloucester, the Marquis of Dorset, and Lord Hastings are alleged to have hurried him from Edward's presence, and to have despatched him in an adjoining apartment with their poinards. The earliest writer who recounted this story was Polydore Virgil, and Mr. Jesse admits that his authority, inasmuch as he had conversed with some of the actors in the scenes which he describes, must be received with considerable deference. On the other hand, it is pointed out not only that Polydore Virgil was notoriously infected with Lancastrian prejudices, but that he wrote his history at the express desire of Henry VII., and consequently with every inducement to malign the character and acts of Richard III. Moreover, there are extant the accounts of still older writers than Polydore Virgil, not one of whom charges Richard of Gloucester with being a participant in this crime. Buck, on the authority of a contemporary MS., asserts that when the attack was made on the young Prince "the Duke of Gloucester only, of all the great persons, stood still, and drew not his sword." Fabyan, an Alderman of London and a contemporary, though he describes the murder as having taken place in the presence of the King, in no way inculpates Richard of Gloucester. The King, he says, "strake him (the Prince) with his gauntlet upon the face, after which stroke, so by him received, he was by the King's servants incontinently slain." Great doubt indeed seems warranted whether the story of the young Prince having been assassinated in the presence of Edward IV. is not altogether a fiction. Of three contemporary writers, De Commines clearly implies that he fell on the field of battle; a second (Warkworth Chronicle) observes, "and there was slain in the field Prince Edward, which cried for succor to his brother-in-law, the Duke of Clarence;" while the third (Fleetwood Chronicle) positively states that the Prince "was taken fleeing to the townwards, and slain in the field." Lastly, Bernard Andreas, who wrote in 1501, and whose prejudices were all arrayed against Richard, plainly implies that the Prince was killed in battle. The accounts which have been handed down regarding the fate of the heir of the House of Lancaster being thus confused and contradictory, with what justice, asks Mr. Jesse, can Richard of Gloucester be arraigned as one of the murderers?

II.

We pass to the second count in the indictment brought by historians against Richard III. On the night of May 21, 1471, the same day on which Edward IV. returned to London, and just seventeen days after the battle of Tewkesbury, perished in durance and misery, the last King of the House of Lancaster, the gentle, pious, and unfortunate Henry VI. On the following day, we are told, his body, "borne barefaced on the bier," and surrounded by "more glaives and staves than torches," was carried from the Tower to St. Paul's, where it remained for some time exposed to the public view, the "face open that every man might see him." "To satisfy the credulous," says Lingard, "it was reported that he died of grief. But though the conqueror might silence the tongues, he could not control the beliefs, nor the pens of his subjects; and the writers who lived under the next dynasty not only proclaimed the murder, but attributed the black deed to the advice, if not to the dagger, of the youngest of the three brothers, Richard Duke of Gloucester." According to Shakespeare, who follows the accounts of Hall and Sir Thomas More, Richard killed the unhappy King with his own hand. In Mr. Jesse's opinion, there is only too much reason for conjecturing that King Henry met his death by foul means. So long as he lived, it was certain that he would be a rallying point for the Lancastrians. Edward IV., then, had strong motives for getting rid of his rival. Not only had he the motive, but there is evidence that he projected Henry's death. "It was resolved," says Habington, "in King Edward's Cabinet Council that, to take away all title from future insurrections, King Henry should be sacrificed." The assertion, if true, imparts significance to the instructions given by Edward to the Archbishop of York, "to keep King Henry out of sanctuary." Still more indicative of Edward's anxiety to rid himself of the deposed monarch is the fact of his having placed him in the front of his army at the recent battle of Tewkesbury. Admitting, however, the grounds for suspecting Edward of instigating the murder, what evidence do we find for charging Richard with the commission of the crime? "He killed by others," says the chronicler Rous, "or, as many believe, with his own hand, that most sacred man, Henry VI." Philip de Commines also writes: "Immediately after this battle the Duke of Gloucester either killed with his own hand, or caused to be murdered in his presence, in some spot apart, this good man, King Henry." When we turn, nevertheless, to less prejudiced contemporary authorities, we either meet with no mention of Gloucester's name in connection with the foul transaction, or else his supposed participation is merely referred to as one of the rumors of the time. "Of the death of this Prince," says Fabyan, "diverse tales were told; but the most common fame went that he was stykked with a knife by the hands of the Duke of Gloucester." Even Polydore Virgil confines himself to the remark that common report attributed the crime to Gloucester. "He slew," writes Sir Thomas More, "with his own hand, as men constantly say, King Henry VI., being prisoner in the Tower." On the other hand, the trustworthy continuator of the Croyland chronicle, though he entertains no doubt of King Henry having been murdered, omits all mention of the name of Gloucester in connection with the event. The Fleetwood and Warkworth chronicles are equally silent on the point. At least one contemporary writer ascribed Henry's death to mere natural causes. According to his statement, such was the effect produced on the mind of the imbecile King by his personal misfortunes and the utter ruin of his friends that "of pure displeasure and melancholy he died." After all, suggests Mr. Jesse, considering the maze of confusion and prejudice through which the seeker after the truth must grope his way to the light, may not this be the true version of a story which for centuries has been invested by the poet and the historian with mystery and horror?

III.

It would be interesting to trace, were it possible, the period and circumstances when Richard of Gloucester first met the Lady Anne, younger daughter of the Earl of Warwick and widow of Edward, the Lancastrian Prince of Wales. It suited Shakespeare to represent their meeting as having taken place at night in the streets of London some twenty days after the battle of Tewkesbury. It was, according to the dramatist, on the occasion when the corpse of King Henry VI. was carried from St. Paul's to Blackfriars for the purpose of being conveyed from the latter place by water to Chertsey. Anne, as chief mourner, is described as ordering the bearers to "set down their honorable load," and then as uttering the most terrible imprecations against the assumed murderer of her husband and her father-in-law. Thereupon Richard is represented as appearing on the stage, as if by accident, and the striking scene follows in which he flatters, woos, and ultimately wins the Lady Anne. Setting aside the improbability of such a scene in such a spot, and under such circumstances, there is evidence that by no possibility could the alleged interview have taken place. At the time when the corpse of Henry VI. was on its way to Chertsey, Richard was marching with his brother, King Edward, against the Bastard Falconbridge, while Anne, who had fallen into Edward's hands after the battle of Tewkesbury, was, in all likelihood, in close custody with her mother-in-law, Queen Margaret, in the Tower. Thence Anne Neville seems to have been transferred to the charge and keeping of her sister, the Duchess of Clarence. It might at first sight be presumed that from this period Gloucester would have favorable opportunities of conversing with and paying court to the Lady Anne. There is proof, however, that this was far from being the case. Clarence had good reasons for wishing to keep his brother and his sister-in-law apart. In right of his wife, the elder daughter of the Earl of Warwick, he claimed to be the sole possessor of the princely domains of the kingmaker, whereas, in the event of Gloucester marrying the younger sister, there could be little doubt but that he would succeed in obtaining a share of the inheritance. Gloucester found himself, accordingly, debarred from any opportunity of preferring his suit, and eventually, as we learn from the continuer of the Croyland chronicle, Clarence, apprehending that King Edward would adopt stringent measures to secure for Gloucester the hand of the Lady Anne, "caused the damsel to be concealed." The romantic fact has been handed down to us that, when Richard at length traced her to her place of concealment, he found the heiress of the Nevilles and the Beauchamps, the widow of a Prince of Wales and the cousin of a reigning sovereign, in an obscure street of London, disguised in the garb of a kitchenmaid.

By those who have been taught to regard Richard of Gloucester as a deformed monster and cold-blooded miscreant, it might naturally be imagined that in assuming the garb and submitting to the drudgery of a serving-woman the object of Anne Neville was to escape from the hateful importunities of a man whom she believed to have been her husband's assassin. As a matter of fact, she seems to have placed herself, without the slightest hesitation, under the protection of Richard, who in the first instance removed her to the sanctuary of St. Martin's-le-Grand, whence she was transferred to the guardianship of her uncle, George Neville, Archbishop of York. In the mean time Gloucester made successful suit for her hand. The date of his marriage to the Lady Anne is uncertain, but, as she bore him a child in 1473, the probability is that they were united in the course of the preceding year, possibly as soon as her year of mourning for young Edward of Lancaster had expired. The Duke of Clarence's apprehensions with regard to the Neville inheritance turned out to be well founded. An act of Parliament passed in 1474 divided the estates of the Earl of Warwick between the two daughters, giving to Clarence and Gloucester each a life interest in his wife's share, should he happen to survive her.

IV.

When Richard of Gloucester played the lover thus successfully, was he in reality the deformed, crooked, repulsive being, such as he is depicted in the prejudiced pages of the Lancastrian chronicles and in the dramas of Shakespeare? According to Sir Thomas More, he was "little of stature, ill-featured of limbs, crook-backed, his left shoulder much higher than his right, and hard-featured of visage." Hall and Speed draw an exactly similar picture. Holinshed also describes him as "small and little of stature," his body "greatly deformed," his "countenance cruel" and "savoring of malice, fraud, and deceit." His very birth is alleged to have been an unnatural and monstrous one. According to one writer, his mother, the Duchess of York, was two years pregnant of him, and when at length she gave birth to him she suffered intolerable anguish. Hall tells us that he came into the world "feet forward." "At his nativity," says the chronicler Rous, "the scorpion was in the ascendant; he came into the world with teeth and with a head of hair reaching to his shoulders." According to Camden, "his monstrous birth foreshadowed his monstrous proceedings, for he was born with all his teeth, and hair to his shoulders." Sir Thomas More also tells us that he came into the world "with his feet forward," and also "not untoothed." Baker, in his Chronicles of the Kings of England, sums up all the imputed imperfections of Richard in a single sentence: "Of body he was but low, crooked-backed, hook-shouldered, splay-footed, and goggle-eyed; his face little and round, his complexion swarthy; his left arm from his birth dry and withered; born a monster in nature, with all his teeth, with hair on his head, and nails on his fingers and toes; and just such were the qualities of his mind."

Such were the qualities which ignorance and prejudice formerly attributed to Richard of Gloucester. Turning, however, to contemporary writers, more than one of whom were not only familiar with the person of Richard but had actually conversed with him, Mr. Jesse is unable to discover any evidence whatever to corroborate the distorted and ridiculous pictures drawn of him by the chroniclers who wrote under the Tudor dynasty. Neither the continuator of the chronicle of Croyland, nor William of Wyrcester, nor Abbot Whethamstede, nor the author of the Fleetwood Chronicle, makes allusion to any deformity in the person of Richard of Gloucester. Rous, another contemporary, bitterly prejudiced as he is against Richard, contents himself with averring that he was small of stature, having a short face and uneven shoulders, the left being lower than the right. But even Rous seems to admit that his countenance was not disagreeable. His face is said to have borne a resemblance to that of his father, the Duke of York, a circumstance which was afterward referred to by Dr. Shaw from the pulpit at St. Paul's Cross, when Richard was himself present. According to the reverend doctor, Richard stood before them "the special pattern of knightly prowess, as well in all princely behavior as in the lineaments and favor of his visage, representing the very face of the noble Duke, his father." Mr. Jesse suggests that, had Richard been the "hard-visaged," "goggle-eyed," "cruel-countenanced" being he has been described, the crowd would have received the baseless flattery with a shout of derision. Philip de Commines, who must have often seen Richard in company with his brother Edward, twice speaks of the latter as the most beautiful prince he had ever seen, and it is submitted that had there existed any remarkable contrast in the personal appearance of the two brothers, it would have been pointed out by the gossiping and free-spoken historian. Again, Stow, who was inquisitive in regard to the persons and habits of princes, though he seems to have made diligent inquiries among "ancient men" who had seen Richard of Gloucester, could arrive at no other conclusion than that he was "of bodily shape comely enough, only of low stature." Lastly, the old Countess of Desmond, who had danced with Richard, declared to more than one of her contemporaries that he was the handsomest man in the room, except his brother Edward, and very well made. Sharon Turner, who was a careful investigator, made up his mind that Richard's "face was handsome," and Horace Walpole, after a minute examination of the authorities, was convinced that what Rous tells us of Richard's having had uneven shoulders is the truth, but that with this exception the King had no personal deformity. "The truth," he says, "I take to have been this. Richard, who was slender and not tall, had one shoulder a little higher than the other; a defect, by the magnifying glasses of party, by distance of time, and by the amplification of tradition, easily swelled into shocking deformity." Mr. Jesse's own impression is that, though Gloucester's stature was low, he was not misshapen; that though his figure was slight, it was compact and muscular; and that, if not exactly handsome, his countenance was far from being unprepossessing.

V.

It is finally pointed out by Mr. Jesse that had Richard of Gloucester been convicted or even suspected of being the villain which Tudor historians represent him to have been, he would not have been trusted to the last by men who were not only personally and intimately acquainted with him, but were experienced and keen-sighted observers of human character. Is it likely, asks the author of this book, that Edward IV. would, in his last moments, have confided to him the guardianship of his children, whom Richard had only to put out of the way in order himself to mount the throne? Or, if men so sagacious as Buckingham and Hastings had entertained any suspicion of his true character, would they have helped to invest him with an authority which subsequently enabled him to shed their blood upon the scaffold, and to seize a crown, which Hastings, at all events, would have died to preserve for the son of Edward IV.?

That Richard of Gloucester was deeply impregnated with the inordinate ambition which was the ruling passion of the Plantagenets; that he yielded to temptation as soon as the allurement became difficult to resist; and that he ultimately possessed himself of the sovereign power by means unjustifiable and unpardonable is not denied. That, however, is not the point at issue in this book. The question which the author would solve is at what particular period of Richard's life temptation grew too powerful to be resisted, and consequently diverted him from the path of virtue and honor to that of perfidy and crime. It is Mr. Jesse's belief that Richard of Gloucester, up to the close of his brother Edward's reign, continued to be a loyal subject, a devoted brother, a useful citizen, and an upright man. Even when the death of Edward forced him into a more extended sphere of action, it seems probable that he originally entertained no deeper design than that of obtaining the guardianship of the young King, and, during the minority, the protectorship of the realm. But as he advanced, step by step, toward the accomplishment of these legitimate ends, the complicated difficulties which confronted him, the plots laid by others against his government and person, and the dangerous possession of a power too great to keep or to resign—added, no doubt, to his inborn ambition and the dazzling temptation of a crown—had each a share in inducing him to consult his own safety by the destruction of others, and to grasp the prize placed within his reach. That from the moment in which he aspired to the protectorship he brought into play the powers of deception and dissimulation of which he proved a consummate master is not disputed by the author of this book. What is affirmed is that it was not till a later period that Richard devised and ordered the black act of blood and treachery which, after a lapse of two years, he was to expiate by his tragical death on Bosworth field. In Mr. Jesse's view, Richard of Gloucester figures at two different periods of his life as an entirely distinct person. Nor can any one deny that the difference seems startling between the youthful and upright prince—who dispensed even-handed justice in his northern government at Pontefract, and who, alone of the great English nobles, refused to accept the gold of Louis XI. for advocating the disgraceful treaty of Pequigny—and the man who as Richard III. became the murderer of his nephews and the guilty possessor of a crown.

The Barber It Was that Died.

From the Cleveland Plain Dealer.

AKRON, May 7.—Mr. George Shaffer, a barber, died to-day. On Wednesday as he was shaving a customer he accidentally cut his thumb. It began to give trouble at once, and blood poisoning soon set in.

QUESTIONS BY SUN READERS.

All the poems called for last Sunday have been placed by various kindly readers, whom we thank collectively; each one will kindly take his or her share, and not like a boodle Alderman, depart with another's share. As to the poem containing the lines:

> Every breaking wave had tales to tell
> Of wrecks far out at sea,

E. W. Cole writes that the name of the poem is not given in the copy he has, but the author is George Arnold. The poem is as follows:

> Gray distance hid each shining sail,
> By ruthless breezes borne from me,
> And lessening, fading, faint, and pale,
> My ships went out to sea.
>
> Where misty breakers rose and fell,
> I stood and sorrowed hopelessly,
> For every wave had tales to tell
> Of wrecks far out at sea.
>
> To-day a song is on my lips;
> Earth seems a paradise to me,
> For God is good, and lo! my ships
> Are coming home from sea!

As to the other poem, M. A. G. writes: "The lines—

> 'There is another life I long to meet,
> Without which life my life is incomplete,'

are to be found in the drama entitled 'Led Astray,' by Dion Boucicault. In the published play the lines are not in quotation marks, and I therefore assume that the late accomplished plagiarist was the author."

Another friend says: "I do not recall that it was entitled 'Fate,' or had any title, and in the old days of the Union Square Theatre Charles Thorne would read it thus:

> 'There is another life I long to meet,
> Without which life my life is incomplete.
> Oh! sweeter self, like me art thou astray,
> Striving with all thy might to find the way
> To mine. Striving like mine to find the breast
> On which alone can weary heart find rest.'"

The Latin-English poem is not by Principal Forbes of St. Andrews. The following letter explains why it isn't—because some one else wrote it:

It was a fugitive effort from the pen of my father, the late Mr. John Kendrick of Waterbury, Conn., and was written and composed by him on the fly leaf of a text book while attending a recitation in Yale College in his senior year (1843). In Morgan's "Macaronic Poetry" the piece is given entire and credit given to its real author. I append the poem as taken correctly from that work. It will be noticed in the Moral (second line) that the plural number (mures) changes to the singular ve be ("prœbe" and "facis"). This my father, when taken to task, was wont to say was a poetic license, and was intended to individualize each of the "mures," as well as to render the construction more compact and elegant. He thus defended his Latin as grammatical in what might unglossed be regarded by a critic as an awkward inaccuracy.

"VERY FELIS-ITOUS."

> Felis sedit by a hole,
> Intenta she cum omni soul,
> Prendere rats.
> Mice cucurrerunt o'er the floor,
> In numero duo, tres, or more,
> Obliti cats.
>
> Felis saw them oculis.
> "I'll have them," inquit she, "I guess,
> Dum ludunt."
> Tunc illa crept toward the group,
> "Habeam," dixit, "good rat soup,
> Pingues sunt."
>
> Mice continued all ludere,
> Intenti in ludum vere
> Gaudenter.
> Tunc rushed the felis into them,
> Et tore them omnes, limb from limb,
> Violenter.
>
> MORAL.
>
> Omnes mures nunc be shy,
> Et aurem prœbe mihi,
> Benigne.
> Si hoc facis, verbum sat,
> Avoid a devilish hungry cat
> Studiose.

A friend informs us that the ram Dunderberg was sold to France and renamed Rochambeau.

In reference to his ascription of the poem "Tell Me, Ye Winged Winds," to Lady Flora Hastings, T. W. writes: "I copied from the "Songs of the Hutchinsons," celebrated concert singers of years ago, and the author's name was prefixed the same as sent to THE SUN. I would say that the poem has been in my possession for upward of forty years."

In your report in Monday's SUN of the Single Taxers' meeting Sunday night, you say:

"One man wanted to know how the single tax doctrine would affect him if he invested $1,000 in a lot which in a short time became worth $10,000. 'Would you tax me,' said he, 'on the $9,000 increase of value?'

"'I would tax you, my dear friend,' said the Congressman, 'on every cent of the $10,000.'"

My point was: If I saved out of my earnings $1,000—invested them with the result mentioned, should I not, under the single tax, be paying taxes for the man who spent all he earned—would not this be discriminating against the very class of men who make the best citizens, and putting a premium on improvidence. What say you?

AMERICAN CITIZEN (British born).

But it would teach you not to buy more land than you actually needed; besides, would you not be suffering for the good of the many? But really, that is just what the single tax is to do; prevent or discourage persons from having more money than they need to live on, to bring about an equal distribution of money. Mr. George and his followers are logical in applying their theory.

Which is correct, replevied or replevined?

J. Y. J. & Co.

Replevied; replevin is a noun and not a verb. You are right.

What is the Chamber of Commerce? The question came up on account of the recent liveliness manifested by that organization.

G. W.

The Chamber of Commerce, historically, is the oldest commercial organization in the United States, having been chartered by George III. in 1770. Its objects are "to promote and encourage commerce, support industry, adjust disputes relative to trade and navigation, and procure such laws and regulations as may be found necessary for trade in general." It has no legal right to interfere in legislation; but being composed of many of the leading merchants of the city it has weight as an advisory council in public matters. It maintains a Court of Arbitration, presided over by a Judge, who decides many cases, and helps to avoid many prolonged litigations. It took part in the celebration of Washington's inauguration and in the Columbian celebration, and has raised funds for various worthy objects; the latest fund was for the Sea Island negroes.

In a lecture recently it was said that there were no horse cars in London. Is that so?

J. SACKVILLE.

It did not use to be so. There were trams or horse cars a few years ago, and we think there are some there yet.

What is the meaning of the word "Mizpah"?

S.

"Mizpah" appears as a name in Genesis, xxxi., verses 48 and 49: "And Laban said, This heap is a witness between me and thee this day. Therefore was the name of it called Galeed, and Mizpah; for he said, The Lord watch between me and thee, when we are absent one from another." That wasn't a prayer that the Lord should watch over them while they were apart. The heap of stones was a boundary mark between the possessions of Laban and his son-in-law, Jacob. Laban, who had suffered much from Jacob's swindling ways, set up the heap, and called God to witness that their relations were at an end.

1. Will you kindly inform me whether or not the copyrights have run out on stories of 1830—published in that year by a paper called the *New York Mirror*? 2. We have also quite a number of colored plates of the styles of men and women's dress of that time. Kindly let me know whether they have any value.

M. H. JR.

1. The copyrights in stories published in 1830 must have run out in 1872 at latest. 2. These patterns may have value if you know how to use them; but they can't have much value where they are.

Will you please name some book written by a man with agnostic views—that is concise and to the point? Did Voltaire make a "death-bed" confession of Christ?

AGNOSTIC.

Agnostic views what on? Herbert Spencer is the principal agnostic. Voltaire was only a fair-weather agnostic, or infidel; he received communion on several occasions, and a few months before his death made his peace with the Church. We don't think he made any formal confession thereafter.

What formal process is necessary to legalize the insertion of an old family name as a middle name?

A. S. M.

You must make application to the Common Pleas or the City Court, setting forth your reasons; within ten days after the court's order you must publish the order in some newspaper, and within twenty days you must file all the papers with the clerk of the court, and on the thirtieth day you must assume the new name.

What is the present duty on imported manufactured cotton goods? Also what would the duty be should the Wilson bill become law?

OLD SUBSCRIBER.

The duties are too many to quote. They are set forth in schedule I. of the McKinley tariff, sections 342-355, inclusive, and in schedule I. of the Wilson bill, sections 250-264, inclusive.

Kindly state where Andrew Carnegie's "A B C of Money" can be bought. The booksellers here say they can't get it.

[illegible]

We guess they tell the truth. You might write to Mr. Carnegie for a copy; he's somewhere abroad.

Was not the late James G. Blaine directly responsible for the nomination of Whitelaw Reid for Vice-President in the last Presidential election, and was not Blaine's resigning from the Cabinet and his attitude toward the ticket the direct cause of its defeat?

[illegible]

We reply to both questions, Probably not.

Will you inform me what Prince Albert's family name was and what Queen Victoria's would be if she had taken it, as in ordinary marriages?

A. H. S.

Prince Albert's family name was Wettin. Queen Victoria's was Guelph. Her name now would be Wettin.

W. N. Coburg.—A woman is appointed Postmaster, not Postmistress.

C. Ulpt.—Arion is pronounced A-ri-on; Aryan is pronounced Ar-yan.

Saint.—The letters Ph. G. after a person's name signify that he is a graduate in pharmacy.

C. Burke.—The highest building in this city is that of the Manhattan Life Insurance Company, which is about 324 feet high.

Jay F. Bee.—If a woman leaves her husband and for twenty-five years he hears nothing of her he has a right to marry again; and if the first wife turns up he has two legal wives.

J. F. Rogers.—Sir John Lubbock's list of the best hundred books was published about four years ago. It is in a small book called "The Pleasures of Life," published by Macmillan & Co.